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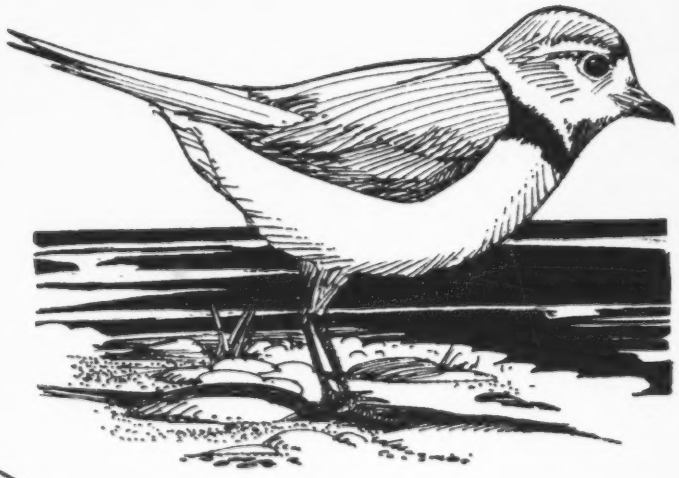
Aerial Reconnaissance Surveys for Piping Plover Habitat in East-Central Alberta, May 2001



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Alberta Species at Risk Report No. 26

Alberta
SUSTAINABLE RESOURCE DEVELOPMENT

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Aerial Reconnaissance Surveys for Piping Plover Habitat in East-Central Alberta, May 2001

David R. C. Prescott

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EXECUTIVE SUMMARY

The Piping Plover (Charadrius melodus) is designated as an endangered species in Alberta and across Canada. Every five years since 1991, a continent-wide survey for Piping Plovers has been conducted, with the third such effort scheduled to occur in June 2001. In May 2001, aerial reconnaissance was conducted over much of the core breeding range in east-central Alberta. The objectives were to (1) identify waterbodies that have not been previously surveyed, but which contain areas of suitable habitat that could be surveyed in 2001, and (2) visit a number of lakes scheduled to be surveyed during the international census, in order to identify areas of suitable habitat to be visited, and to minimize or eliminate census effort in areas with unsuitable breeding habitat.

Three flights, totaling 19 hours, were conducted in a Cessna 172 aircraft flying between 200 and 500 m above ground. The potential to support breeding Piping Plovers in 2001 was subjectively determined ("High", "Medium", "Low", or "None") for each basin based on the extent, distribution and condition of gravel substrates. Previously unsurveyed lakes were considered candidates for subsequent ground surveys if they had either "High" or "Medium" potential.

Forty-one lakes were surveyed in the Bow Region, including 10 lakes that were surveyed on previous international censuses. Three of these 10 lakes were deemed to have "High" or "Medium" potential to support Piping Plovers in 2001, whereas two lakes were considered to have no suitable habitat. Nine previously unsurveyed lakes were believed to have reasonable ("High" or "Medium") potential to support plovers in 2001. Fifty-nine lakes were surveyed in the Parkland Region. Eight of 21 previously surveyed basins were considered to have "Medium" or "High" potential, whereas four were deemed to have no current habitat for plovers. Seven new lakes were considered to be candidates for ground surveys. Twenty-five lakes in the Northeast Boreal Region were visited. Only two of 11 lakes that were previously surveyed were considered to have "Medium" or "High" quality habitat in 2001, with five lakes having no current potential. Six previously unsurveyed lakes had reasonable potential to support Piping Plovers in 2001.

Overall, the aerial surveys identified 11 previously surveyed lakes that had no potential to support Piping Plovers in 2001, and 22 new lakes with at least moderate potential to support birds during the breeding season. Ground surveys will be needed to confirm the accuracy of habitat assessment from the air. However, aerial reconnaissance appears to be an effective way to minimize or eliminate visits to unpopulated lakes, and for discovering previously unknown lakes that may be occupied by Piping Plovers. Future flights should focus on areas within 100 km of the Saskatchewan border, and on large reservoirs south of 51°N.

1.0 INTRODUCTION

The Piping Plover (Charadrius melodus) is designated as an endangered species in prairie Canada by the Committee on the Status of Endangered Wildlife in Canada (Anonymous 2000), and also in Alberta under the provincial Wildlife Act (Prescott 1997). Every five years since 1991, a continent-wide survey for Piping Plovers has been conducted on both the breeding grounds (Atlantic coast, Great Lakes and Canadian prairies/Northern Great Plains), and wintering grounds (primarily the Gulf of Mexico). In Alberta, 47 lakes were surveyed in 1991, with a total of 180 Piping Plovers being detected (Hofman 1994). In 1996, a total of 103 lakes were visited, with 276 Piping Plovers being recorded (Bjorge 1997, Bjorge and Murphy, in prep.). The survey will be conducted for the third time in 2001. All 103 lakes visited in the 1996 survey are scheduled to be revisited in 2001. However, the availability of the preferred breeding habitat (wide, sparsely vegetated gravel shorelines) is dependent on alternating dry and high water cycles. Therefore, a number of lakes visited in previous years are not likely to support suitable habitat in 2001. Furthermore, there are many waterbodies in Alberta that have not previously been surveyed for plovers, but which likely support breeding birds. Knowledge of habitat conditions within the breeding range of the Piping Plover at the time of the survey would therefore allow the census effort to be directed most efficiently to areas where plovers are likely to occur in the province.

In the spring of 2001, reconnaissance flights were conducted over the core of the known breeding range of the Piping Plover in east-central Alberta. The specific goals were to:

1. Identify waterbodies that have not been previously surveyed, but which contain areas of suitable habitat that could be surveyed in 2001, and

2. Visit a number of lakes scheduled to be surveyed during the international census, in order to identify areas of suitable habitat to be visited, and to minimize or eliminate census effort in areas with unsuitable breeding habitat.

2.0 METHODS

During the winter of 2000-2001, biologists and naturalists familiar with Piping Plovers and their habitat in Alberta were consulted to determine areas where there was a high probability of detecting previously unknown breeding areas for Piping Plovers. These consultations revealed two main areas: the region north of the North Saskatchewan River between St. Paul and the Saskatchewan border (northeastern corner of the Parkland Region and southeastern corner of the Northeast Boreal Region[1]), and the southeastern Parkland and northwestern Bow regions in a triangular zone bounded by Stettler, Oyen and Drumheller. Survey routes were planned that intersected major water bodies in these areas that had either never been checked in the past, or that were scheduled for survey in 2001 (i.e., had been surveyed during previous international censuses).

[1] The Bow, Parkland and Northeast Boreal regions are administrative regions of Alberta Sustainable Resource Development. See http://www.gov.ab.ca/env/regions.html for descriptions.

In May 2001, two observers familiar with the habitat requirements of Piping Plovers flew over all targeted lakes in a Cessna 172 aircraft. Lakes were initially surveyed at an altitude of 500 m, but the aircraft descended to 200 m if closer examination was warranted. Decisions on the suitability (High, Medium, Low, None) of habitat were achieved by consensus among the two observers. In general, "High" probability was assigned to lakes with extensive areas of wide, unvegetated shoreline with apparent gravel substrates, "Medium" to lakes with suitable substrates but narrower or more vegetated shorelines, "Low" to lakes with minimal exposed substrates, or with suitable substrates in dry basins, and "None" to basins with no suitable substrates (many of these were dry and vegetated). Approximate GPS locations were taken from the approximate centre point of each waterbody, or from the closest approach made by the aircraft to that point.

3.0 RESULTS

Flights were conducted on three occasions (15, 17 and 30 May 2001), and totaled approximately 19 hours in duration. Tables 1-3 summarize information gathered from the surveys in each administrative region. These tables include only the lakes that were specifically targeted for surveys, or other lakes en route that were suspected of having some potential to support plovers. Numerous other small basins (mostly unnamed) were inspected during the course of the flights, but were either dry (following several years of below-average precipitation in many areas), or appeared to have no obvious potential to support nesting plovers. It should be cautioned that fine gravel (preferred nesting habitat of Piping Plovers) was often difficult to discern from the air, so habitat ratings should be confirmed through ground-based visits to lakes. Such visits are anticipated during the 2001 international census for many of the "Medium" and "High" probability lakes classified during this aerial survey.

3.1 Bow Region

Forty-one lakes were surveyed in the Bow Region (Table 1), including 10 lakes that were surveyed on previous international censuses. Of these, only three lakes were considered to have "High" (Handhills and Dowling lakes) or "Medium" (Plover Lake) potential. We also identified two previously unsurveyed lakes that appeared to have "High" potential for breeding plovers (Berry Creek Reservoir and Coleman Lake), and seven new lakes with "Medium" potential (Bartman Reservoir, Blood Indian Creek Reservoir, Dragon Lake, Sounding Creek Reservoir, and three unnamed lakes). These lakes should be high priorities for population survey in 2001. We also determined that two lakes (Sounding and Majors) that were included in previous surveys now have no potential for breeding plovers, and will be eliminated from the 2001 census. Both lakes have been dry for several years, and have been extensively cultivated.

Table 1. Summary of lakes surveyed for potential Piping Plover habitat in the Bow Region of Alberta in May 2001.

Site[1]	Lat(°N);Long(°W)	Comments	Current Suitability
Antelope Lake	51.678; 111.260	Dry, no obvious gravel.	None
Bartman Reservoir	51.100; 111.450	Middle of lake on E side and small island on S side have potential. Some gravel all around.	Medium
Berry Creek Reservoir	51.292; 111.60	Appears to be very good habitat all along W side (particularly middle section), also narrower habitat on E shore. High priority for ground survey in 2001.	High
Berry Lakes	51.083; 111.500	Dry, no habitat.	None
Blood Indian Creek Reservoir	51.240; 111.220	Some potential locations, although no really wide shorelines. Worth ground survey. Area has high recreational use.	Medium
Brosten Reservoir	51.367; 111.083	Dry, except for extreme southern end. Appears to have some gravel, but not extensive.	Low
Cessford Reservoir	51.017; 111.450	Dry, no habitat.	None
Chain Lakes*[2]	51.833; 112.150	All lakes dry. Suitable habitat on various lakes already documented from past surveys.	Low
Coleman Lake	51.433; 111.867	Much excellent habitat on many islands and peninsulas. High priority for survey in 2001.	High
Craig Lake	51.950; 111.583	Dry.	Low
Dowling Lake*	51.733; 112.000	Lake mostly dry. Suitable, well-documented habitats occur around lake.	High
Dragon Lake	51.680; 110.103	Complex lake with lots of bays and peninsulas, some gravel on south side, possibly elsewhere. Very saline.	Medium
Fitzgerald Lake	51.791; 111.067	Dry. Appears to have small amounts of gravel. Perhaps future potential.	Low
Foster Lake*	52.229; 110.550	Dry, saline with small amounts of gravel.	Low
Goose Lake	51.688; 111.342	Both lakes dry and vegetated.	None
Gooseberry Lake*	52.114; 110.761	Some potential on N side (especially large spit near Provincial Park), and E end. Sparse gravel. No visible habitat on S shore.	Low
Greenlee Lake*	52.201; 110.485	Dry and saline with little gravel.	Low
Handhills Lake*	51.500; 112.092	Good habitat in many spots.	High
Kirkpatrick Lake	51.867; 111.317	Dry. No obvious habitat.	None
Majors Lake*	51.133; 111.179	Dry, cultivated. Some gravel with future potential.	None
Man-made pond SW of Sheerness Reservoir	51.418; 111.830	Has gravel all around (especially W side). Low probability but worth a check.	Low
McBride Reservoir	51.328; 111.358	Dry, saline basin. May have future potential.	None
Mudspring Lake*	51.842; 112.781	Dry, but has small amounts of gravel on most shores. Low potential, but should be checked.	Low
Oakland Lake	51.398; 111.826	Dry and vegetated. No current habitat but S end has gravel and some future potential.	None
Plover Lake*	51.492; 111.397	Has water, gravel quite sparse. E shore very narrow, whole W side has potential, particularly on southern 2/3. Best habitat is on SW side.	Medium
Rushmere Lake	51.817; 111.117	Two dry saline lakes with sparse gravel. May have potential in a wet year.	Low

Table 1, con't

Site[1]	Lat(°N);Long(°W)	Comments	Current Suitability
Sheerness Reservoir	51.450; 111.802	Very small amount of habitat at picnic area on N end.	Low
Sounding Creek Reservoir	51.569; 110.721	Lots of peninsulas, difficult to tell if gravel present. Should be surveyed from ground.	Medium
Sounding Lake*	52.159; 110.513	Dry, mostly vegetated (most of W basin has been cultivated). Small amount of gravel on large peninsula on S side with future potential.	None
Togo Lakes	51.450; 111.118	Two southern lakes are dry. Northern lake has narrow shoreline on S side. Small peninsula on SE side has some potential.	Low
Traung Lake	51.383; 111.883	Dry and vegetated.	None
Unnamed lake, 0.5 km S of Handhills L.	51.467; 112.100	Looks like very good habitat, although shoreline is fairly steep.	Medium
Unnamed lake, 13 km S of Cereal, straddling SH 886	51.301; 110.801	Dry lake, but with some potential habitat. Should be checked in a wet year.	Low
Unnamed lake, 18 km S of Cereal on W side of SH 886	51.259; 110.808	Dry. Lots of peninsulas, but no obvious gravel. Worth a check in a wet year.	Low
Unnamed lake, 5 km S of Cereal on E side of SH 886	51.367; 111.750	Dry, no apparent gravel.	Low
Unnamed lake 2 km ENE Bartman Reservoir	51.117; 111.402	Dry, no habitat.	None
Unnamed lake, 8 km SSE of Blood Indian Creek Reservoir on Blood Indian Creek	51.149; 111.256	Extensive saline with some water in S end. Appears to be little gravel, but some potential.	Low
Unnamed lake, 8 km N of Blood Indian Creek Reservoir	51.345; 111.189	Some potential gravel areas, worth a visit.	Medium
Unnamed lake, 6 km S of Plover L.	51.404; 111.438	Saline flats with some water. No apparent gravel, but may have some potential.	Low
Unnamed lake, 8 km N of Scotfield	51.635; 111.338	Dry, saline basin with some gravel. No current habitat, but future potential.	None
Unnamed slough between Chain Lake #1 and Dowling L.	51.758; 112.258	Not dry, and appears to have some suitable habitat. Should be checked from ground.	Medium

[1] Asterisk (*) denotes lakes surveyed during previous international censuses (1991 and/or 1996) and scheduled for survey in 2001.

[2] "Chain Lakes" is a series of small lakes that are treated as separate (numbered) basins during the international census.

3.2 Parkland Region

Fifty-nine lakes were surveyed in the Parkland Region (Table 2), including 21 basins that have been surveyed in previous years. Of these, only three lakes were deemed to have "High" potential (Akasu, Birch and Christopher lakes), with an additional five lakes being considered to have "Medium" potential (Red Deer, Rider, Thomas and Sullivan lakes, and Rockeling Bay). Four previously surveyed lakes appeared to have no potential for breeding plovers in 2001 (Joseph, Lonepine, Oliver and Wilkins lakes), and will be eliminated from the international census for 2001. Plain Lake was the only lake not included in previous surveys that appeared to have "High" potential for breeding plovers, whereas six new lakes (Emelien, Geneva, Hansman, Long and two unnamed lakes) were determined to have "Medium" potential. These lakes will be added to the 2001 census effort.

3.3 Northeast Boreal Region

Twenty-five lakes were examined during aerial surveys in the Northeast Boreal Region, including eight that had preciously been surveyed (Table 3). Only one of these lakes (Muriel) was considered to have "High" potential, with Lower Therien Lake having "Medium" potential. Five previously surveyed lakes (Bunder and Floatingstone lakes, Lake Eliza, Lac Brosseau and Lac St. Cyr) were considered to have no suitable habitat, and will be omitted from the 2001 census. Of the 17 previously unsurveyed lakes, two were determined to have "High" potential habitat (Frog and Reita lakes) and four were described as having "Medium" potential (Cushing, Island and Wasagamu lakes, and Lac Sante).

4.0 DISCUSSION

The aerial surveys conducted in 2001 identified 11 previously surveyed lakes that have unsuitable habitat and can be removed from the 2001 International Piping Plover Census. Of these, only two (Sounding and Oliver lakes) have ever been known to support plovers (Prescott 1997, Goossen et al. 2000). Ground visits, which would undoubtedly have revealed no local breeding populations, would have taken 10-15 person-days to complete on these 10 lakes. The aerial reconnaissance therefore proved to be an effective means of eliminating unnecessary manpower and time that will be at a premium during the relatively short international census period (3-16 June). In addition, specific areas of suitable habitat on other lakes were identified, which will further focus the field effort during the 2001 census.

Perhaps more importantly than minimizing or eliminating visits to unpopulated lakes is the possibility of discovering previously unsurveyed water bodies that may be occupied by Piping Plovers. Aerial reconnaissance found 22 lakes that were believed to have "High" or "Medium" potential for breeding plovers, and that will be added to the 2001 ground census. It remains to be seen whether Piping Plovers will actually be found on these lakes. It was often difficult to determine the exact nature of substrates from the air,

Table 2. Summary of lakes surveyed for potential Piping Plover habitat in the Parkland Region of Alberta in May 2001.

Site[1]	Lat(°N);Long(°W)	Comments	Current Suitability
Akasu Lake*	53.502; 111.818	High potential habitat on 3 islands, and peninsulas on the W, N and S shore. Entire E side has no habitat.	High
Alice Lake*	52.233; 111.567	Most potential habitat is on two easternmost lakes (primarily in area between the lakes).	Low
Barnett Lake	52.267; 112.583	Lake dry. Spit on W end has potential habitat.	Low
Bellshill Lake	52.600; 111.530	Island at S end and 2 small spits on W side have gravel, but are vegetated. May be future potential.	Low
Bennett Lake	53.853; 110.066	Vegetated shoreline, no habitat.	None
Birch Lake*	53.319; 111.583	Water lower than previous year, more suitable habitat on SW peninsula than previously. Other habitats on lake are well documented.	High
Bittern Lake*	53.060; 113.042	N basin now separate lake. Heavily vegetated and no habitat. Main basin has mostly mud shores. Small amount of gravel on E side (just SW of road access), S side (NNE of town) and SW peninsula.	Low
Buffalo Lake*	52.464; 112.911	Narrow shores with little gravel. Several marginal sites along N and S side, mainly on recreational beaches. Best sites are on E side near Boss Hill.	Low
Chester Lake	53.753; 110.162	Muddy shoreline, no gravel.	None
Christopher Lake*	53.767; 110.257	Numerous small basins, good gravel throughout.	High
Delburne Lakes	52.217; 113.217	No suitable habitat.	None
Demay Lake	53.115; 112.696	Dry, vegetated shore. No gravel, no habitat.	None
Driedmeat Lake	52.867; 112.750	Narrow shores, no visible gravel. Islands are heavily vegetated.	None
DuFrance Lake	53.775; 110.083	No habitat.	None
Dusty Lake	53.120; 112.483	Dry, with vegetated shore. No habitat.	None
Dyke Lake	53.773; 110.279	Very low potential.	Low
Ewing Lake	52.167; 112.867	Spit on S end of lake, just E of where creek enters, has possible habitat.	Low
Farrell Lake	51.867; 112.333	Dry, no suitable habitat.	None
Foxall Lake	52.200; 112.933	No suitable habitat.	None
Garson Lake	53.717; 110.083	Dry.	Low
Geneva Lake	53.491; 111.201	Medium potential habitat on easternmost shore.	Medium
Gough Lake	52.033; 112.467	No suitable habitat.	None
Hansman Lake	52.395; 110.399	Mostly narrow shore, with little gravel. Good potential on spit on central E side, and NW corner.	Medium
Hughenden Lake	52.522; 111.014	High water, no exposed shoreline or obvious gravel.	None
John Lake	53.728; 110.036	Vegetated shoreline. Small amount of gravel around island.	Low
Joseph Lake*	53.284; 113.089	No suitable habitat. Only potential gravel is on island on W side, but occupied by large pelican and cormorant colony.	None
Lac Emelien	53.550; 111.150	Some gravel and large rocks on S and W sides of west basin. East basin has eavily vegetated shore with no suitable habitat.	Medium
Long Lake	53.862; 110.172	3 peninsulas on S shore, and W end have potential.	Medium

Table 2, con't

Site[1]	Lat(°N);Long(°W)	Comments	Current Suitability
Lonepine Lake*	52.233; 112.567	No suitable habitat.	None
Marion Lake	52.200; 112.450	No suitable habitat.	None
Meridian Lake	53.805; 110.043	No habitat.	None
Metiskow Lake*	52.429; 110.643	Dry with sparse gravel. Habitats well documented.	Low
Miquelon Lake #1*	53.203; 112.832	Narrow shore, some potential on island and peninsula on SW shore.	Low
Miquelon Lake #2*	53.228; 112.850	Low potential on E and S shore, and on two islands.	Low
Miquelon Lake #3*	53.245; 112.911	Mostly narrow shore. Some potential on long, thin island in W bay, large point on NW side, 3 islands in NE bay, and near boat launch on S bay.	Low
Oliver Lake*	53.284; 113.010	All vegetated shorelines. Only gravel is on two tiny islands, but too small to have birds.	None
Onion Lake	53.777; 110.161	Vegetated shoreline, no habitat.	None
Plain Lake	53.607; 111.679	Much suitable habitat on N half of lake, lesser potential on S side. Needs thorough survey.	High
Prairie Lake	53.850; 110.025	Mostly dry with heavy vegetation. No habitat.	None
Raft Lake	53.631; 110.717	Wide, vegetated shoreline with sparse gravel.	Low
Red Deer Lake*	52.717; 113.081	Potential habitat around large peninsula on W side, and 4 small points on NE and NW sides.	Medium
Rider Lake*	52.527; 112.772	Gravel habitat quite vegetated, abundant water.	Medium
Rock Island Lake	53.848; 110.113	Water low, now two lakes. Gravel with low potential around S side of western lake.	Low
Rockeling Bay*	52.543; 112.808	Gravel habitat quite vegetated, abundant water.	Medium
Ross Lake	52.233; 112.717	No suitable habitat.	None
Samson Lake	52.731; 113.201	Vegetated shoreline. No habitat.	None
Shooting Lake	52.183; 112.350	No suitable habitat.	None
Shorncliffe Lake	52.471; 110.880	Lots of water, heavily vegetated shore with no current potential. Good peninsulas with underlying gravel might have strong potential in future.	None
Spiers Lake*	51.917; 112.233	Dry – small amount of potential habitat on one site.	Low
Sullivan Lake*	52.000; 112.000	Only water is in NW arm of lake. Gravel habitat on both E and W sides, although shore is narrow. Extreme S and SW corner have no habitat.	Medium
Sunken Lake*	52.383; 110.650	Dry. Gravel habitat on main peninsula is well documented.	Low
Thomas Lake*	53.125; 111.736	Small amounts of habitat on several parts of lake.	Medium
Two Hills Lake	53.738; 110.139	Vegetated shoreline, no habitat.	None
Unnamed lake, 1 km NW of Meridian L.	53.821; 110.061	Gravel on W and N side.	Medium
Unnamed lake, 3 km NE of Metiskow	52.421; 110.597	Mostly dry, with extensive salt flats and sparse gravel in several locations.	Low
Unnamed lake SE of Capt. Eyre L.	52.283; 110.684	Wide shorelines, has water. Gravel appears sparse, but worth a check. Good road access all around.	Medium
Wash Lake	53.777; 110.213	Vegetated shoreline, no habitat.	None
Wavy Lake	52.857; 112.082	Dry, heavily vegetated.	None
Wilkins Lake*	52.599; 111.102	Eastern lake mostly dry with vegetated shoreline. Western lake has water, but shore vegetated.	None

[1] Asterisk (*) denotes lakes surveyed during previous international censuses (1991 and/or 1996) and scheduled for survey in 2001.

Table 3. Summary of lakes surveyed for potential Piping Plover habitat in the Northeast Boreal Region of Alberta in May 2001.

Site[1]	Lat(°N);Long(°W)	Comments	Current Suitability
Alma Lake	53.773; 110.420	3-4 small peninsulas with gravel, but shoreline narrow.	Low
Bunder Lake*	54.267; 111.700	No habitat.	None
Cushing Lake	54.068; 110.441	Peninsula and islands on S side have apparent habitat.	Medium
Fishing Lake	53.900; 110.196	Narrow shorelines, poor habitat.	Low
Floatingstone Lake*	54.229; 111.620	Vegetated shoreline, no habitat.	None
Frog Lake	53.888; 110.325	Extensive, high probability habitat around lake. High priority for survey.	High
Garnier Lake*	53.990; 110.570	Southern lake has narrow shores. Some potential on point on NW side. Northern lake has some gravel, but low potential.	Low
Grassy Island Lake	54.204; 111.431	Narrow, vegetated shorelines. No habitat.	None
Island Lake	53.915; 110.148	SW corner and island on S side should be surveyed. Also several small gravel islands on E side with potential.	Medium
Lac Bellevue	53.811; 111.319	Island in NE corner and W side have low potential.	Low
Lac Brosseau*	53.830; 111.632	Narrow, vegetated shoreline. No habitat.	None
Lac Canard	53.889; 111.347	Gravel spit on the N side of easternmost basin has potential.	Low
Lac Sante	53.818; 111.580	Gravel shore around most of lake. Beaches on E and S shores are wider and have best potential. Lake should be thoroughly searched.	Medium
Lac St. Cyr*	53.904; 111.206	Heavy vegetation around shoreline.	None
Lake Eliza*	53.813; 111.172	Narrow, muddy shoreline. No habitat.	None
Lower Mann Lake	54.167; 111.517	Two gravel islands on SW side with some potential.	Low
Lower Therien Lake*	53.930; 111.356	Medium potential on N side of main (northern) basin, eastside islands and shore should also be checked. Southern basin has habitat on NE side.	Medium
Muriel Lake*	54.106; 110.620	Numerous peninsulas on E and S side of lake with habitat. Other areas not closely checked.	High
Norberg Lake	54.267; 111.583	No habitat.	None
Owls Eye Lake	54.061; 111.387	Small island on S side might have small amount of suitable gravel.	Low
Reita Lake	54.143; 110.395	E and S shores have good potential, lower potential on W and N shore.	High
Sinking Lake	54.137; 110.800	Highly saline, now series of small lakes. Small amount of gravel, no obvious expanses of good habitat.	Low
Upper Mann Lake	54.133; 111.515	Small islands on SE side with some potential.	Low
Upper Therien Lake	53.974; 111.283	Appears to be gravel on W side (island and shore) but heavily vegetated.	Low
Wasagamu Lake	53.827; 110.348	NE and S shore have gravel shores with potential.	Medium

[1] Asterisk (*) denotes lakes surveyed during previous international censuses (1991 and/or 1996) and scheduled for survey in 2001.

and the actual size and distribution of gravel habitats may prove to be different than was reported from the aircraft. Even if many of these areas are confirmed to be appropriate for plovers, much suitable habitat in the province is not occupied in any given year (pers. obs.). Thus, the discovery of previously unsurveyed (and apparently suitable) habitats may not yield many new breeding populations. Nevertheless, aerial reconnaissance, followed by ground-based visits, should yield a number of areas that can be monitored on a regular basis for plovers in future years.

The aerial surveys covered only a small proportion of the range of the Piping Plover in Alberta. There are many other areas that have never been surveyed, and more extensive aerial reconnaissance should be conducted in the future. The most promising area is a band extending approximately 100 km west from the Saskatchewan border, from the North Saskatchewan River in the north to the Red Deer River in the south. This area encompasses many of the major Piping Plover lakes in Alberta, but also contains many unsurveyed basins that are likely to support breeding pairs. Searches should also be conducted south of 51°N latitude, which was the approximate southern limit of the current aerial surveys. Although the southern part of the province does not support large numbers of breeding birds, there are a number of large reservoirs in the area that could be included in future searches. Finally, it should be emphasized that Piping Plover habitat is dynamic, and will change from year to year depending on local water conditions. Many basins examined from the air were dry after several years of below-average precipitation. Almost all of these basins were deemed to have little or no potential to support Piping Plover populations in 2001, but could likely become suitable after a future high-water event. This includes a number of basins that have supported birds on past censuses. Thus, regular aerial surveys may be necessary to monitor broad-scale changes in the distribution and quality of Piping Plover habitat in the province. This will allow biologists and managers to make more accurate assessments of the size and distribution of Piping Plover populations in the province as natural conditions vary.

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